UVa Online Judge

10709 Intersection is not that Easy

In this problem your job is to find the distance between two lines or a line and a line segment or two line segments. Suppose we have two points $\mathbf{A}(x_1, y_1)$ and $\mathbf{B}(x_2, y_2)$ on a two dimensional Cartesian plane. If we connect **A** and **B** then we get line segment **AB**. But if we connect **AB** and extend it on both side at infinite length then we get line **AB**.

Input

The input file contains several sets of inputs. The description of each set of input is given below:

The description for each set of input is given in two lines. Each line contains four integers and a string. First line contains x_1, y_1, x_2, y_2 and S_1 and the second line contains x_3, y_3, x_4, y_4 and S_2. The value of S_1 and S_2 can be either '`L`' or '`LS`' which stands for "**Line**" and "**Line-segment**" respectively. (x_1, y_1) and (x_2, y_2) are the endpoints of first line segment or they are just two different points on the first line depending on the value of S_1. The same story applies for the second input line for this set. Input is terminated by a set where the value of S_1 and S_1 is '`END`'. This set should not be processed. Point (x_1, y_1) and (x_2, y_2) are always different. Similarly point (x_3, y_3) and (x_4, y_4) are also always different. All the integers in the input file have absolute value less than **101**.

Output

For each set of input you should produce one line of output which contains a single floating-point number indicating the distance between the two lines or line segments or the distance between one line and one line segment. This floating-point number contains five digits after the decimal point. Errors less than **2e-5** will be ignored.

Sample Input

```
10 10 20 20 L
-10 -10 19 19 L
10 10 12 13 LS
11 11 19 20 LS
10 10 12 12 END
11 11 23 34 END
```

Sample Output

```
0.00000
0.27735
```